Lake Tahoe Total Maximum Daily Load
Forest Uplands Focus Team
Meeting Summary

September 11, 2007, 11:15 am – 2:00 pm

Session 1 objective: Discuss potential options for reducing forest upland sources of fine particles, nitrogen and phosphorus to Lake Tahoe

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Meeting Attendees: Mark Grismer, Michael Hogan, Kevin Drake, Sue Norman, Cyndi Walck, Theresa Loupe, David Fournier, Dave Roberts, Mike Vollmer, Martin Goldberg, Mike Shophirt, Phil Scoles, Harold Singer, Hannah Schembri, Kim Gorman, John Reuter, Chad Praul, Bob Larsen, Doug Smith, John Riverson, Larry Benoit, Jeremy Sokulsky, Jack Landy, Michele Sweeney (facilitator), Rebecca Bryson (note-taker)

Overview of the Presentations

Introduction and Opening Statements

The facilitator opened the meeting by explaining that that this was the first meeting of the Urban and Groundwater Focus Team, comprised mainly of agency staff. She noted that there are three other focus teams meeting: Atmospheric Deposition, Forest Uplands, and Stream Channel. The objectives of the meeting were:

1. To update the Focus Team on the latest TMDL-related research and answer any initial questions and clarify the materials presented.
2. To get feedback from the Focus Team on how the information is organized and presented prior to the first public presentation
3. To receive input on potential options for reducing atmospheric sources of fine particles, nitrogen and phosphorus to Lake Tahoe, and
4. To provide recommendations on additional research needed or policy matters raised by proposed pollution controls.

Water Board Presentation:

Bob Larsen, the Project Leader from the Lahontan Regional Water Quality Control Board (Water Board) gave a brief overview of the TMDL process and findings to date. This presentation and the most recent documents produced by the TMDL can be found at: http://www.waterboards.ca.gov/lahontan/TMDL/Tahoe/Tahoe_Index.htm.

Forested Uplands Experts' Presentation

Michael Hogan and Kevin Drake from Integrated Environmental along with Dr. Mark Grismer from UC Davis presented. Their presentation is available at the URL listed in the previous paragraph. A summary of their analysis can be found in section 4.2 of the Lake Tahoe TMDL Pollutant Reduction Opportunity Report, also available at the URL above.

Question and Comment Session

The Forested Uplands and Groundwater source category group and members of the TMDL team answered a variety of questions during the session.

Burn Distinction: There was a question about whether there was any distinction in their analysis of those areas that had experienced wildfire versus prescribed burns. The team noted that the LSPC model uses the "equivalent roaded area" (ERA) methodology to account for these differences. The Forest Service staff has done extensive analysis characterizing the relative impacts of harvest and burn events—whether prescribed or wildfires—and has determined ERAs for each area, which are essentially a representation of how much of the impacted area behaves like an unpaved road. ERAs were spatially referenced for every event that occurred during the period of the team's calibrations and were incorporated into/overlaid on the land use layer. The team then clarified that prescribed and managed fire was included in the category of "veg burn".

Prescribed Burns: There was a question about the expected increase in prescribed burns over the next 20 years and whether they were predicted in the analysis. The team noted this was excluded because the analysis is based on existing conditions, as opposed to predictions of future treatment effects. It was noted that there is a literature review of fire effects on water quality in the Forest Uplands Appendix B. Sue Norman noted that there is a very useful report that does predict impacts from wildfire that could be helpful. It is from the Rocky Mountain Research Station and it is under the General Technical Reports section of their website. This excellent resource addresses the impacts of wildfire on air, water quality, flora and fauna in four large volumes.

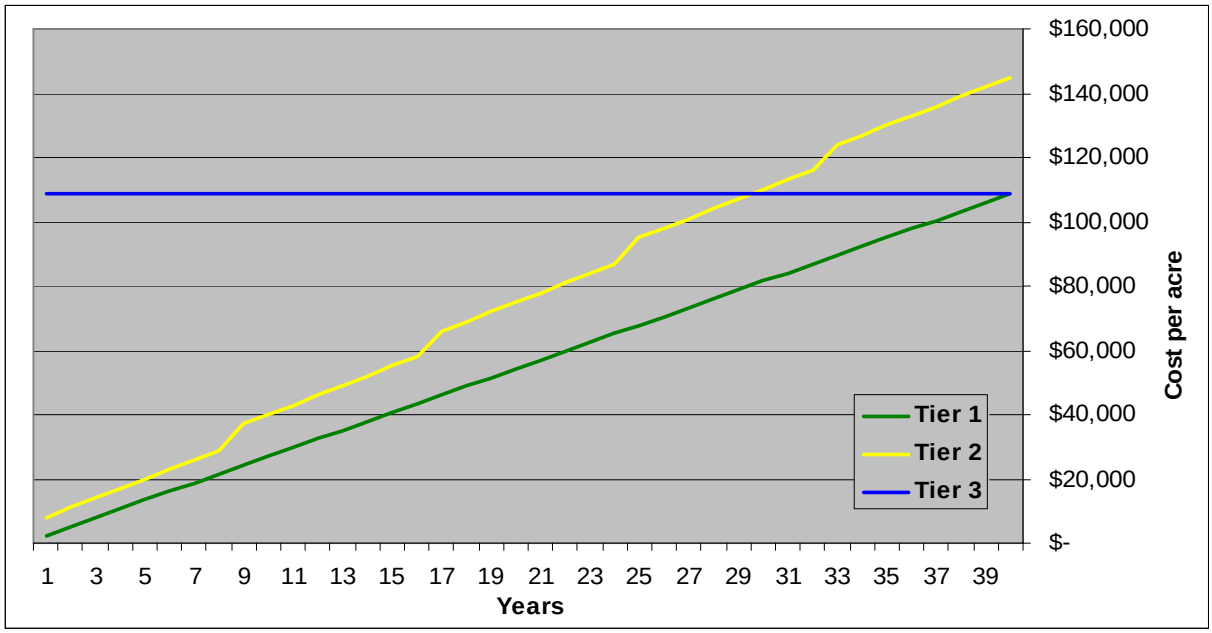
Phosphorus and Nitrogen Data: Larry Benoit asked whether the source for phosphorus and nitrogen data was from the 2006 Soil Map Unit analysis and how different was their baseline data from Tahoe baseline. Larry pointed out that the reason for a study in 1997 was that there was no phosphorus data on Tahoe soils. So if there are questions on why the load reductions are so low, we need to be clear on the source. It was explained that the team used data from the LSPC model/database to estimate the nitrogen and phosphorus numbers by subwatershed. In terms of the reduction in P and N, the only reductions in loads included in their calculations are those based on increased infiltration and reduced runoff rates. The team noted that this was a conservative estimate because several of the treatments include creation of plant biomass that will also affect these numbers and may affect atmospheric deposition, so the numbers are conservative.

John Riverson noted that the Watershed Model does not use the coefficients from the 2006 Soil Map directly as inputs in the model. The team calibrated the model using EMCs (representing the loadings from land uses) and LTIMP data, which includes 10 major tributary outlets representing 50% of all Tahoe Basin stream flows. Their calibration effort was to get the sediments and nutrient loads at those outlets (in the model) to be consistent with what was observed. For the reductions, they did provide GIS spatial summaries of soil properties that were used to inform the equations that Mark described.

Legacy Road Treatment: Cyndie Walck commented that the graph showed much larger costs for Treatment Tier 3 in Setting A than Tier 2. Is this based on mostly legacy road treatment? If so, she believed that Tier 3 versus Tier 2 cost differential should not be too great? Once you get the equipment to the site, it is not that much more to do a full treatment. She noted that in Setting A, the analysis shows that one can get almost 100% reduction by eliminating the roads, but in Setting C, it is never 100% because there is natural level of erosion. Is the amount of reduction indicated for Setting C for the whole of the area, or just looking specifically at roads. Because her data shows that almost all erosion is from roads. Therefore are the costs really that high if you just focus on the roads in that setting?

The team explained that the numbers are approximations and the next step is to get more field info on road removal and what are the impacts, for example you need to clean up the gullies created from the old roads. Cyndie responded that Tier 2 may be a one time, lower cost but you haven't necessarily fixed the issue the same as you would have by going to Tier 3. The team also noted that it is important to examine these issues over a 20 year maintenance/life cycle as explained above. For example, hydromulching is cheap but the life cycle is only 1-2 years.

The team noted it was not its charge to go out over 20 years, but it is important to analyze it over this type of scope/timescale. To this end, the team did some analysis to show that at 30 years, the cost of on-going Tier 2 treatment will be equal to and then exceed what would have been spent for a one-time Tier 3 treatment. At 40 years, the cost of on-going Tier 1 treatments, such as mulching, will be equal to and continue exceeding what would have been spent for a one-time Tier 3 treatment. See diagram below.



It was noted that another thing that plays into this, is that as we do more, we find better ways to do the same thing at a lower cost. Or, we find ways to integrate a number of practices. For example, we want to reconstitute organic matter into the soil while a land manager is out there trying to remove biomass and we could use the trees he/she is cutting down. As we integrate different elements of landscape management, we reduce costs across the board, which can help pay for these practices.

Future Studies/Considerations:

- Need to take into account in the calculations the economies of scale of combined landscape management practices.

John Reuter pointed out that even if the cost is the same, the confidence we would have of Tier 3 being effective is much higher than for Tier 1 treatments. It was also noted however, that a good percentage of the unpaved roads are currently in use and cannot be removed/restored.

Infiltration Rates Methodology: Regarding the methodology used for determining the infiltration rates, the team noted that they used rainfall simulations. They assumed steady infiltration near the surface and did not consider subsurface issues. Once the ground is saturated, the modeling automatically adjusts the infiltration rates accordingly. However, the modeling did not account for any hydrophobic soil effects.

Costs regarding the Forested Setting: David Fournier asked for a clarification on the costs. He noted that the costs for PCOs for Setting C were calculated on the basis of restoring/addressing 10% of the acres in the Forested Setting, but it appears - given the cost of $2.9m - as if the team did a cost estimate for all the acres in this setting. The team confirmed that for their cost estimates they assumed that 10% of every acre would need to be treated and then multiplied that by the number of acres.

Cyndie questioned whether the analysis also included the predicted costs of restoring roads that would be built in the future for maintenance or fuels reduction efforts. She noted that if so, this would be inconsistent with the cost projections in the other 2 treatment tiers. The team was also asked to clarify what percentage of the Forested Setting, they considered to be legacy roads and they replied less than 0.5% The team noted that the numbers do account for the cost of using and then restoring the roads necessary to do thinning, but do not account for the cost of the thinning itself.

Assumed Efficiency of BMPs: There were several questions about how the efficacy of certain BMPs were established. The team noted that the model/data were limited so they did not look at individual BMPs, but rather lumped them into Tiers. They did acknowledge that there are different forest practices and different accounts of cost estimates depending on USFS, State Parks, Conservancy or private land treatments. In terms of Tier 3, for example, they only took into account the impacts of full restoration. They noted that treatments in Tier 2 assumed treatment on 5% of the area and the addition of 5% roads to achieve those treatments.

Impacts of More Aggressive Fuels Removal: There was a question about how pollutant loads will be affected by the increase in mechanical removal of fuels in SEZ and more aggressive fuels reduction in general. The team noted that they had not studied that issue and that it would be difficult to predict the impact of future as of yet unquantified activities.

Future Studies/Considerations:

- Research further how pollutant loads will be affected by increases in mechanical removal of fuels in SEZ and more aggressive fuels reduction in general.

Legacy Roads: Sue Norman asked about the basis for the information/assumption regarding legacy roads. She reported that the USFS has done an inventory on legacy roads in the Basin. They identified 100 miles of roads in 7 seven years and have restored almost all of them. She believes that the other unpaved roads the USFS does know about; however are still in use by USFS and are not legacy roads. She noted that as part of that inventory, she had them look for obliterated roads and her teams could never find them as they were all overgrown.

The team responded that in their analysis/judgment, there are still many legacy roads that may have been "grown over" or revegetated but are still affecting the functioning of the soil. They acknowledged that the legacy roads might have been difficult for USFS staff to find if they did not know where to look, or they might use different criteria to determine that they were restored. Michael Hogan explained that in his prior and ongoing work in the Basin, he has often encountered old roads where manzanita has completely overgrown the road. However, when analyzed, his team found that the level of compaction was just as great as it was 15-20 years prior when first built and it was creating streams/ gullies. The team noted that in its professional judgment, they would estimate that 5% of each area in the Forested Setting contains erosion hot spots (from various historical activities).

Road Connectivity: Sue Norman also asked whether the analyses of yield considered connectivity of roads to water bodies because USFS analysis indicates different results. The team noted that they did not analyze the spatial distribution of roads in relationship to water bodies. They stressed that they would need a new set of tools to do the calculations at that level, however, that coul be important to address in a future stage of analysis.

Sue noted that USFS is developing a synthesis of information about forest thinning and the affects on water quality which should be available in about 2 months. Their WEPP modeling shows that actual delivery of sediment to a water body is considerably less than the erosion generated, depending on the location of the site and the water body. This must be represented in order to prioritize treatment. Sue suggested that TMDL research should correlate LSPC modeling and SCG work with the forthcoming USFS results. Two different models are being used with different resolutions. They should be reconciled in the implementation phase. The TMDL should check with the USFS to determine a realistic level of implementation for future restoration/obliteration.

She noted that if the team has estimated the cost, but do not fully know the benefits, then the numbers would be less accurate. It was noted that the atmospheric deposition team had used a transport fraction to account for the load reductions prior to reaching the Lake and that a similar calculation could be developed for the model here. She questioned spending billions of dollars just to eliminate 350 MT as called for in Setting A.

Temporary Treatment of Roads and Landings: David Fournier noted that there will be long-term needs for access in the Forested Setting. He did stress, however, that in general USFS has not built temporary roads for fuels treatment; they use existing roads. USFS has maps of all Level 1 roads. They know exactly they are there and that they are available to use even if they are vegetated. While some full obliteration of roads is needed, he asked whether some roads and landings could be BMPed and laid to rest for a few decades and then resurrected when needed again. It was noted that this could be specific to a watershed.

Increased Thinning Efforts/SEZs: Sue Norman explained that the next stages of forest management in the Basin include significant thinning efforts. If USFS has to restore and recontour all the roads, they will then just have to recommission them. Since the Angora fire, there has been increased demand for fuels reduction – quicker and cheaper. Sue Norman acknowledged that it was very important to be careful in the SEZs and the report should acknowledge that. She asked if the study had made any recommendations on project design, measures, and tools. She suggested it would be very useful if the TMDL model could tell USFS where it is appropriate to treat more land quicker and cheaper.

Future Studies/Considerations:

- Need more in-depth research on future forest management issues/potential impacts.
- Use TMDL model to help inform USFS's future thinning efforts - where it is appropriate to treat a greater land area quicker and cheaper.

Flow Splitting: Scott Cecchi asked about the potential impacts of flow splitting, or diverting "clean" Forest flows before they enter urban areas and overload water quality improvement facilities. He explained that they are considering this option in Keller Canyon and he wanted to know if there could be modeling to determine when it is appropriate based on the cost/benefit of the necessary infrastructure and the effects on overall hydrologic function. The team noted that they do have information by subwatershed and the model could predict what type of water quality impacts might be expected based on its functional condition. They stressed, however, that it would be more useful to incorporate field monitoring information from this Keller Canyon project into the TMDL model to help analyze the impacts of this type of approach in other areas.

Sources or Sinks: Tim Hagen then asked what role do overgrown, forested areas serve within the impervious/built-out urban areas. Are they becoming sources rather than sinks. The team noted that this should be considered from a biogeochemical perspective.

Prescribed Burns/Catastrophic Fires: There was a question about whether future development/change has been accounted for, and whether a reasonably foreseeable future condition – such as increase in prescribed burns – could be incorporated into the model. For example, in the Veg_harvest and Veg_burn categories, can the model anticipate the impacts of the increased burns in the next 20 years, and develop the best management practices and cost information possible to inform the TMDL implementation plan?

John Riverson explained that the model could incorporate these inputs, but it does not do that yet, and it was discussed by the team as a potential next step. For example, one could look at the areas proposed for timber harvesting and incorporate them. The issue is that before the Tetra Tech contract expires, it will be important to find a place to house the running/updating of the model so such factors can continue to be analyzed.

It was noted that in terms of Martin Goldberg's question on incorporating the impacts of catastrophic wildfire; however, it is more difficult to model. Without knowing where, when and how large, it is too speculative. It was acknowledged that at this time there is not a lot of information on fire in the LSPC – except for the Gondola Fire. John Reuter and audience members noted that now is the perfect time to start gathering information from the Angora fire to use as input, and that monitoring is already in place, but that additional time is needed for data collection and analysis.

Michael Hogan reiterated that most of what they modeled was forest treatments, but that that does need to be balanced by the potential of future fires. Particularly with climate change, studies show that the number of wildfires in the Sierra has increased and will continue increasing. It was noted that in the CWE analysis for the South Shore, there was a GEO-WEPP analysis being used to predict the water quality effects of not treating an area and having a catastrophic fire instead.

It was noted that as the pressure on USFS increased to treat the Forested Areas, it would be critical to lay out factors important in that consideration: what questions should be addressed, what tools could be used. It was suggested that a Working Group be formed to look specifically at these issues. This group could provide a forum for meaningful discussion regarding the types of fuels reduction/fire management activities proposed and what type of mitigation could off-set potential impacts. While it was acknowledged that this approach could be useful in elevating the issue to the regional planning level and allow people to assess trade-offs, it was also noted that it should not be so closely tied to the TMDL process that it might delay the process. It is important not to hold up the TMDL because studies/discussions in this particular area are not yet resolved.

Future studies/considerations:

- Consider developing a fuels reduction/water quality Working Group to examine trade-offs associated with increased forest management related to wildfire.
- Establish long-term plan to house the Watershed Model/LPSC model and identify/fund appropriate staff to run/update model at end of Tetra Tech contract.
- Begin incorporating potential impacts of increased fuels reduction activities and catastrophic wildfire, as feasible, into the model.

Summary of Future Studies/Considerations

Technical

- Study short-term and long-term cost tradeoff comparison including analysis of O&M vs. Capital costs.
- Study ways to integrate elements of landscape management into treatment efforts to increase cost effectiveness.
- Use Angora fire as an opportunity for study; begin incorporating impacts of increased fuels reduction activity/catastrophic wildfire, as feasible, into model.
- Incorporate findings of USFS-commissioned study
- Research further how pollutant loads will be affected by increases in mechanical removal of fuels in SEZ and more aggressive fuels reduction in general.

Policy

- Develop consistent inter-agency information/understanding regarding legacy roads; agree on how many legacy roads currently affect soil hydrology
- Develop criteria for erosion control project implementation – splitting forest and upland
- Develop/clarify proximity to waterbody analysis
- Identify long-term funding for updating and running models
- Determine where/how wildfire prevention enters into an all-agency management equation
    - Specify the role of the TMDL in this process
    - Help identify the factors that need to be considered using models
    - Determine need to establish a related working group?

Next Steps

The facilitator thanked the Focus Team for their input and emphasized the importance of the Focus Team members' attendance at the follow up meetings outlined below:

September 27th 8am to 5pm: Pathway Forum Workshop
October 11th 8am to 5pm: TMDL Focus Team Meeting (with all Teams Together)
October 25th 8am to 5pm: Pathway Forum Workshop
December 6th: 8am to 5pm: Pathway Forum Workshop
February 7th: 8am to 5pm: Pathway Forum Workshop and Focus Team Mtg Final